

**BEFORE THE
PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA**

DOCKET NO. 2018-1-E

In the Matter of
Annual Review of Base Rates
for Fuel Costs for
Duke Energy Progress, LLC

) **DIRECT TESTIMONY**
) **OF BRYAN P. WALSH FOR**
) **DUKE ENERGY PROGRESS, LLC**
)
)

1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A. My name is Bryan P. Walsh and my business address is 526 South Church Street,
3 Charlotte, North Carolina 28202.

4 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

5 A. I am General Manager of Fossil-Hydro Organizational Effectiveness for Duke
6 Energy Carolinas, LLC (“DEC”). Although I am a DEC employee, I provide
7 services to Duke Energy Corporation (“Duke Energy”) and its subsidiaries,
8 including Duke Energy Progress, LLC (“DEP” or the “Company”) and DEC.

9 **Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND**
10 **PROFESSIONAL BACKGROUND.**

11 A. I graduated from The Catholic University of America with a Bachelor of Mechanical
12 Engineering degree. I also graduated from the Georgia Institute of Technology with
13 a Master of Science in Mechanical Engineering. I am a registered Professional
14 Engineer in the State of North Carolina. My career began with Duke Energy as part
15 of Duke / Fluor Daniel in 1999 as an associate engineer assisting in the design and
16 commissioning of new combined-cycle power plants. I transferred to Duke Power in
17 2003 and worked in the Technical Services group for Fossil-Hydro. Since that time,
18 I have held various roles of increasing responsibility in the generation engineering,
19 operations areas, and project management, including the role of technical manager at
20 DEC’s Marshall Steam Station, and also station manager at Duke Energy Indiana’s
21 Gallagher Station & Markland Hydro Station. I was also the Midwest Regional
22 Manager from 2012 to 2015, with overall responsibility for the Midwest Gas
23 Turbine Fleet and various coal-fired facilities in Indiana and Kentucky. I was named

1 General Manager for Outages & Projects in the Carolinas in 2015. I became the
2 General Manager of Fossil-Hydro Organizational Effectiveness in 2017.

3 **Q. WHAT ARE YOUR DUTIES AS GENERAL MANAGER OF FOSSIL-**
4 **HYDRO ORGANIZATIONAL EFFECTIVENESS?**

5 A. In this role, I am responsible for the governance and oversight of standards for
6 operations, maintenance, project management and outage management for Duke
7 Energy's fleet of fossil, hydroelectric, and solar (collectively, "Fossil/Hydro/Solar")
8 facilities. The team also provides services for technical training, workforce
9 development, business planning and continuous improvement.

10 **Q. HAVE YOU TESTIFIED BEFORE THIS COMMISSION IN ANY PRIOR**
11 **PROCEEDINGS?**

12 A. No.

13 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS**
14 **PROCEEDING?**

15 A. The purpose of my testimony is to (1) describe DEP's Fossil/Hydro/Solar generation
16 portfolio and changes made since the 2017 fuel cost recovery proceeding, as well as
17 those expected in the near term, (2) discuss the performance of DEP's
18 Fossil/Hydro/Solar facilities during the period of March 1, 2017 through February
19 28, 2018 (the "review period"), (3) provide information on significant fossil/hydro
20 outages that occurred during the review period, and (4) provide information
21 concerning environmental compliance efforts.

1 **Q. PLEASE DESCRIBE DEP'S FOSSIL/HYDRO/SOLAR GENERATION**
 2 **PORTFOLIO.**

3 A. The Company's Fossil/Hydro/Solar generation portfolio consists of 9,268
 4 megawatts ("MWs") of generating capacity, made up as follows:

5	Coal-fired -	3,544 MWs
6	Combustion Turbines -	2,867 MWs
7	Combined Cycle Turbines -	2,568 MWs
8	Hydro -	227 MWs
9	Solar -	62 MWs ¹

10 The 3,544 MWs of coal-fired generation represent three generating stations
 11 and a total of seven units. These units are equipped with emission control
 12 equipment, including selective catalytic reduction ("SCR") equipment for removing
 13 nitrogen oxides ("NO_x"), flue gas desulfurization ("FGD" or "scrubber") equipment
 14 for removing sulfur dioxide ("SO₂"), and low NO_x burners. This inventory of coal-
 15 fired assets with emission control equipment enhances DEP's ability to maintain
 16 current environmental compliance and concurrently utilize coal with increased sulfur
 17 content – providing flexibility for DEP to procure the most cost-effective options for
 18 fuel supply.

19 The Company has a total of 33 simple cycle combustion turbine ("CT")
 20 units, the larger 14 of which provide 2,183 MWs, or 76% of CT capacity. These 14
 21 units are located at the Asheville, Darlington, Richmond County, and Wayne County
 22 facilities, and are equipped with water injection and/or low NO_x burners for NO_x

¹ This value represents the relative dependable capacity contribution to meeting summer peak demand, based on the Company's integrated resource planning metrics. The nameplate capacity of the Company's solar facilities is 141 MWs.

1 control. The 2,568 MWs shown as “Combined Cycle Turbines” (“CC”) represent
2 four power blocks. The H.F. Lee Energy Complex CC power block (“Lee CC”) has
3 a configuration of three CTs and one steam turbine. The two Richmond County
4 power blocks located at the Smith Energy Complex consist of two CTs and one
5 steam turbine each. The Sutton Combined Cycle at Sutton Energy Complex
6 (“Sutton CC”) consists of two CTs and one steam turbine. The four CC power
7 blocks are equipped with SCR equipment, and all nine CTs have low NO_x burners.
8 The steam turbines do not combust fuel and, therefore, do not require NO_x controls.
9 The Company’s hydro fleet consists of 15 units providing 227 MWs of capacity.
10 The Company’s solar fleet consists of four sites providing 62 MWs of dependable
11 capacity.

12 **Q. WHAT CHANGES HAVE OCCURRED WITHIN THE**
13 **FOSSIL/HYDRO/SOLAR PORTFOLIO SINCE DEP’S 2017 ANNUAL FUEL**
14 **PROCEEDING?**

15 A. Sutton CT Unit 1 retired in March 2017, which reduced capacity by 11 MWs.
16 Sutton CT 2A and 2B were retired in July 2017, which reduced capacity by 48
17 MWs. Corresponding with the retirements, the company brought online two new
18 fast start CTs at Sutton in July 2017, adding 39 MWs of capacity for each CT for a
19 total of 78 MWs of capacity. Darlington CT Unit 9 retired in June 2017, which
20 reduced capacity by 50 MWs.

21 **Q. WHAT ARE DEP’S OBJECTIVES IN THE OPERATION OF ITS**
22 **FOSSIL/HYDRO/SOLAR FACILITIES?**

23 A. The primary objective of DEP’s Fossil/Hydro/Solar generation department is to

1 provide safe, reliable and cost-effective electricity to DEP's customers. Operations
2 personnel and other station employees are well-trained and execute their
3 responsibilities to the highest standards in accordance with procedures, guidelines,
4 and a standard operating model. Like safety, environmental compliance is a "first
5 principle," and DEP works very hard to achieve high level results.

6 The Company achieves compliance with all applicable environmental
7 regulations and maintains station equipment and systems in a cost-effective manner
8 to ensure reliability. The Company also takes action in a timely manner to
9 implement work plans and projects that enhance the safety and performance of
10 systems, equipment, and personnel, consistent with providing low-cost power
11 options for DEP's customers. Equipment inspection and maintenance outages are
12 generally scheduled during the spring and fall months when customer demand is
13 reduced due to milder temperatures. These outages are well-planned and executed
14 with the primary purpose of preparing the unit for reliable operation until the next
15 planned outage.

16 **Q. HOW MUCH GENERATION DID EACH TYPE OF GENERATING**
17 **FACILITY PROVIDE FOR THE REVIEW PERIOD?**

18 A. For the review period, DEP's total system generation was 62,461,644 megawatt-
19 hours ("MWHs"), of which 33,128,805 MWHs, or approximately 53%, was
20 provided by the Fossil/Hydro/Solar fleet. The breakdown includes a 37%
21 contribution from gas facilities, 15% contribution from coal-fired stations, 0.9%
22 contribution from hydro facilities, and 0.4% from solar facilities.

1 The Company's portfolio includes a diverse mix of units that, along with its
2 nuclear capacity, allow DEP to meet the dynamics of customer load requirements in
3 a logical and cost-effective manner. Additionally, DEP has utilized the Joint
4 Dispatch Agreement, which allows generating resources for DEP and DEC to be
5 dispatched as a single system to enhance dispatching at the lowest possible cost.
6 The cost and operational characteristics of each unit generally determine the type of
7 customer load situation (e.g., base and peak load requirements) that a unit would be
8 called upon or dispatched to support.

9 **Q. HOW DID DEP COST EFFECTIVELY DISPATCH THE DIVERSE MIX OF**
10 **GENERATING UNITS DURING THE REVIEW PERIOD?**

11 A. The Company, like other utilities across the U.S., has experienced a change in the
12 dispatch order for each type of generating facility due to continued favorable
13 economics resulting from the low pricing of natural gas. Further, the addition of
14 new CC units within DEP's portfolio in recent years has provided DEP with
15 additional natural gas resources that feature state-of-the-art technology for increased
16 efficiency and significantly reduced emissions. These factors promote the use of
17 natural gas and provide real benefits in cost of fuel and reduced emissions for
18 customers. Gas fired facilities provided 69% of the DEP Fossil/Hydro/Solar
19 generation during the review period.

20 **Q. WHAT WAS THE HEAT RATE FOR DEP'S COAL-FIRED AND**
21 **COMBINED CYCLE UNITS DURING THE REVIEW PERIOD?**

22 A. Heat rate is a measure of the amount of thermal energy needed to generate a given
23 amount of electric energy and is expressed as British thermal units ("Btu") per

1 kilowatt-hour (“kWh”). A low heat rate indicates an efficient fleet that uses less heat
2 energy from fuel to generate electrical energy. Over the review period, the
3 Company’s seven coal units produced 29% of the Fossil/Hydro/Solar generation,
4 with the average heat rate for the coal-fired units being 10,739 Btu/kWh. The most
5 active station during this period was Roxboro, providing 70% of the coal production
6 for the fleet with a heat rate of 10,364 Btu/kWh. During the review period, the
7 Company’s four combined cycle power blocks produced 62% of the
8 Fossil/Hydro/Solar generation, with an average heat rate of 7,103 Btu/kWh.

9 **Q. PLEASE DISCUSS THE OPERATIONAL RESULTS FOR DEP’S**
10 **FOSSIL/HYDRO/SOLAR FLEET DURING THE REVIEW PERIOD.**

11 A. The Company’s generating units operated efficiently and reliably during the review
12 period. Several key measures are used to evaluate the operational performance
13 depending on the generator type: (1) equivalent availability factor (“EAF”), which
14 refers to the percent of a given time period a facility was available to operate at full
15 power, if needed (EAF is not affected by the manner in which the unit is dispatched
16 or by the system demands; it is impacted, however, by planned and unplanned
17 maintenance (*i.e.*, forced) outage time); (2) net capacity factor (“NCF”), which
18 measures the generation that a facility actually produces against the amount of
19 generation that theoretically could be produced in a given time period, based upon
20 its maximum dependable capacity (NCF *is* affected by the dispatch of the unit to
21 serve customer needs); (3) equivalent forced outage rate (“EFOR”), which
22 represents the percentage of unit failure (unplanned outage hours and equivalent
23 unplanned derated hours); a low EFOR represents fewer unplanned outage and

derated hours, which equates to a higher reliability measure; and, (4) starting reliability (“SR”), which represents the percentage of successful starts.

The following chart provides operational results categorized by generator type, as well as results from the most recently published North American Electric Reliability Council (“NERC”) Generating Unit Statistical Brochure (“NERC Brochure”) representing the period 2012 through 2016. The NERC data reported for the coal-fired units represents an average of comparable units based on capacity rating.

<i>Generator Type</i>	<i>Measure</i>	Review Period	2012-2016	<i>Nbr of Units</i>
		DEP Operational Results	NERC Average	
<i>Coal-Fired Test Period</i>	EAF	80.1%	82.0%	446
	NCF	30.2%	58.3%	
	EFOR	8.0%	7.6%	
<i>Coal-Fired Summer Peak</i>	EAF	90.5%	n/a	n/a
<i>Total CC Average</i>	EAF	85.6%	84.8%	301
	NCF	78.5%	53.0%	
	EFOR	0.73%	5.5%	
<i>Total CT Average</i>	EAF	80.0%	87.6%	826
	SR	98.1%	98.1%	
<i>Hydro</i>	EAF	96.1%	81.1%	1,120

Q. PLEASE DISCUSS SIGNIFICANT OUTAGES OCCURRING AT DEP’S FOSSIL/HYDRO/SOLAR FACILITIES DURING THE REVIEW PERIOD.

A. In general, planned maintenance outages for all fossil and hydro units are scheduled for the spring and fall to maximize unit availability during periods of peak demand.

1 Most units had at least one short planned outage during this review period to inspect
2 and maintain plant equipment.

3 Roxboro Unit 4 had a planned outage in Spring 2017. The primary
4 purpose of the outage was to tie-in the new dry bottom ash system. Asheville Unit 1
5 had a planned outage in Spring 2017 to perform inspections and maintenance on the
6 boiler, SCR, FGD, and air preheaters. Roxboro Units 1-4 had a planned outage in
7 Fall 2017. The primary purpose of the outage was to upgrade the FGD control
8 systems and to perform boiler maintenance.

9 The CC fleet performed planned outages at Richmond County CC PB4 and
10 PB5 in Spring 2017. The primary purpose of the PB4 and PB5 outages was to
11 perform borescope inspections on the combustion turbines and perform balance of
12 plant equipment maintenance.

13 The CT fleet performed planned outages in Spring and Fall 2017. In Spring
14 2017 Asheville CT Unit 4 had a planned outage to perform a combustion inspection
15 and to upgrade the controls system. In Fall 2017 Richmond County CT Unit 1 and
16 Darlington Unit 12 and Unit 13 had planned outages. The primary purpose of the
17 Richmond County CT outage was to perform a generator rotor rewind and re-wedge
18 the stator. The outage on Darlington Unit 12 and Unit 13 was to upgrade the
19 protection relay system.

20 **Q. HOW DOES DEP ENSURE EMISSIONS REDUCTIONS FOR**
21 **ENVIRONMENTAL COMPLIANCE?**

22 **A.** The Company has installed pollution control equipment on coal-fired units, as well
23 as new generation resources, in order to meet various current federal, state, and local

1 reduction requirements for NO_x and SO₂ emissions. The SCR technology that DEP
2 currently operates on the coal-fired units uses ammonia or urea for NO_x removal and
3 the scrubber technology employed uses crushed limestone or lime for SO₂ removal.
4 SCR equipment is also an integral part of the design of the newer CC facilities in
5 which aqueous ammonia (19% solution of NH₃) is introduced for NO_x removal.

6 Overall, the type and quantity of chemicals used to reduce emissions at the
7 plants varies depending on the generation output of the unit, the chemical
8 constituents in the fuel burned, and/or the level of emissions reduction required. The
9 Company is managing the impacts, favorable or unfavorable, as a result of changes
10 to the fuel mix and/or changes in coal burn and utilization of non-traditional coals.
11 Overall, the goal is to effectively comply with emissions regulations and provide the
12 optimal total-cost solution for operation of the unit. The Company will continue to
13 leverage new technologies and chemicals to meet both present and future state and
14 federal emissions requirements including the Mercury and Air Toxics Standards
15 (“MATS”) rule. MATS chemicals that DEP may use in the future to reduce
16 emissions include, but may not be limited to, activated carbon, mercury oxidation
17 chemicals, and mercury re-emission prevention chemicals. Company witness Ward
18 provides the cost information for DEP’s chemical use and forecast.

19 **Q. DOES THAT CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?**

20 A. Yes, it does.